PATENT SPECIFICATION

656,868

Date of Application and filing Complete Specification: Nov. 25, 1948.
No. 30606/48.
Application made in United States of America on Dec. 4, 1947.
Complete Specification Published: Sept. 5, 1951.

Index at acceptance:—Classes 66, D(1b: 7fx); and 94(ii), D3.

COMPLETE SPECIFICATION

Improvements in or relating to a Conical Paper Cup and Method of Making the same

We, LILY-TULIP CUP CORPORATION, a corporation organised under the laws of the State of Delaware, United States of America, of 42nd Street and Lexington Avenue, New York, State of New York, United States of America (Assignees of WALTER E. AMBERG), do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a paper cup of the dispensable type and to a cup of this general type of general frusto-conical form but with the bottom rounded to a substantial distance from the apex of the cone from which the cup is formed.

An object of the invention is to create a bottom to a conical cup of less than sixty degrees angle whereby all substances served therein may be accessible to a conventional household spoon.

Another object of this invention is to provide an improved paper cup of less than sixty degree angle consisting of an acute amended frusto-conical side wall merging at its smaller end in a pleated bottom. The pleated bottom of the paper cup is sufficiently large to make the entire bottom accessible to a spoon and to direct the fluid in the cup when agitated for suspending dissolvable fluids in the cup to aid the mixing thereof. Preferably, the bottom of the paper cup is formed by gathering into pleats the paper of an appreciable portion of the side wall of a conical paper cup at the apex end thereof.

Other objects of the invention are to provide a cup of this type in which the paper is most economically used, the process of forming is reduced to its simplest steps, and the resultant cup is neat in appearance and readily telescoped within similarly formed cups for shipping.

[Price 2/-]

Still another object of the invention is to provide a cup of this character in which the rounded bottom is finished with a water resistant impregnation which gives added strength to the cup bottom.

The present invention provides a conical paper cup having a rounded bottom, said rounded bottom being formed by pleating the apex of the cup in a series of pleats.

The present invention further provides a paper cup with a body substantially in the form of a frusto-cone having a rounded bottom formed by a geometrical gathering of excess paper.

The present invention further provides a method of forming a conical paper cup which includes the steps of forming a plurality of small regular pleats in the apex portion of the cup and compressing the pleated portion of the cup into a rounded bottom.

Other features of the invention will be seen from the following detailed specification read in connection with the accompanying drawings forming part thereof and in which:

Figure 1 shows a strip of blanks from which one type of cup is formed;

Figure 2 shows a cup in the early stages of fabrication;

Figure 3 shows a cup completely formed before rounding the bottom;

Figure 4 shows a cup mounted upon a male die in position for descent of the female die;

Figure 5 shows a cup being formed between the male and female dies;

Figure 6—11, show a cup in successive stages, of formation of the rounded bottom;

Figure 12 shows a cup completely formed;

Figure 13 shows a modified form of cup with rolled or beaded lip;

Figure 14 shows a fragmentary vertical section of the rounded bottom

of the cup;

Figure 15 shows a cup pleated with a modified form of pleat in the vertical direction;

Figures 16 and 17 show horizontal sections of vertically pleated cup bottoms;

Figure 18 shows a vertical section of a rounded vertically pleated cup bottom; and

Figure 19 shows a horizontal section of a vertically pleated cup bottom taken on the line 19—19 of Figure 18.

THE ROUNDED BOTTOM CUP

Dispensable paper cups of the conical type are widely used to provide a hygienic receptacle at soda fountains, in restaurants, in work gangs, and in the home. Cups of this type are normally formed in the shape of a cone with a very sharp apex, as the paper at the apex is usually more than one ply in thickness and brought to a firm and sharp point. This pointed cup apex not only presents a definite hazard in the handling and use of cups of this type but also forbids the use of a spoon to remove the final contents of the cups as the pointed portion of the cup remains inaccessible to a spoon and also produces vortices when the contents of the cup are stirred, which prevents dissolving of much of any solid content which may be in the liquid in the cup. The pointed portion of the cup usually also serves to collect the solid portion of the content of the cup and prevents its removal either by stirring or by means of a spoon.

These difficulties, encountered in the use of the ordinary conical paper cup, are eliminated if a substantial portion of the conical side walls at the apex end of the cup can be deformed and the cup provided with a rounded bottom which is sufficiently large to make it accessible to a spoon and so alters the characteristic motion of the fluid in the cup when stirred as to insure that the solids will be most readily dissolved and will not settle out into an inaccessible portion of the cup.

The purpose of this invention is to meet these objections to the conical paper cup by providing a frusto-conical cup with a rounded bottom and a method of simply and uniformly forming such cups.

The accompanying drawings show a preferred form of the cup and method of its manufacture.

Referring to Figure 1, the cup blank 21 may be cut from a continuous strip 20 and is formed into a conical paper cup by rolling the blank about a conical mandrel which moves about its apex at the point 22 so that the blank edge 23 forms the rim of the cup and the concave edge 24 forms the inner cup seam, while the straight blank edge 26 forms the outer cup seam, as shown in Figures 2 and 3. The side wall of the cup becomes frusto-conical and merges at the small ends in a rounded bottom, having appreciable vertical and horizontal internal radii. The formed cup is maintained as a cone by means of the adhesive strip 25 by which the free edge of the blank is secured to the body of the cone.

The cone, as finally formed by the method to be hereinafter described, assumes the shape shown in Figure 12 in which the conical apex of the originally formed cup has been manipulated, deformed and compressed into the rounded bottom 27, which is the characteristic novelty of this cup.

If desired, the rounded bottom may be further strengthened and the cup improved by the use of a water resistant impregnation at the lower end of the cup such as that indicated by the numeral 28. This impregnation may be of wax or any of the so-called plastic materials which are water resistant and will readily bond to paper and can be manipulated and compressed with the paper in the method of forming the rounded bottom which is hereinafter outlined.

The impregnation may be applied to the cup blank during its process of formation or the apex portion of the completed conical cup may be immersed in the impregnation material prior to the further deformation and rounding of the cup bottom. The addition of the water resistant material not only strengthens the cup and increases its durability in use with the cup filled with liquid, but also gives the cup a smoother and more finished appearance than is possible with paper alone.

THE METHOD OF FORMING THE CUP

The method of forming the rounded bottom is indicated in Figures 4—11 inclusive of the drawings and may be generally described as the formation of a series of pleats at the apex portion of the cup and then compressing this pleated portion of the cup into the rounded form of bottom desired in the final cup.

In Figure 4 the cup 29 is shown mounted upon a suitable conical male mandrel 30. Surmounting the cup is shown the female die member 31 with the plunger 32 about to engage the apex portion of the cup. The female and male dies are designed to form a complementary matrix for the cup and will

vary in construction according to the manner to be pursued in forming the pleats.

The dies are preferably so arranged as to form a single pleat at one time. This pleat may be either formed by simple compression dies or may be formed by spinning the conical cup about suitable mandrels so as to form the pleats successively.

In Figure 5 the dies shown in Figure 4 have been brought together in the first stage of performing the method herein-further described.

In Figure 6 the cup 29 is shown after a single application of a die to form the pleat 33 at about the line at which the rounded bottom is to be formed upon the cup.

In Figure 7 the cup 29 has been again treated either by compression dies or by spinning, to form the second pleat 34, while in Figures 8, 9, 10 and 11 further stages of this work are shown resulting in the addition of successive pleats 35, 36 and 37, and as shown in Figure 11, the final compression of the apex of the conical cup at 38.

The number of pleats is immaterial but it is important that they be small so as not to bunch or pile up substantial portions of the paper cup body into small areas.

After the cup has been formed into the form shown in Figure 11, a round die may be applied so as to compress the plurality of pleats into a continuous rounded bottom, as shown.

The manner in which the pleats are finally arranged in the formation of the cup bottom is shown in the fragmentary section of the cup bottom, Figure 14, in which the successive pleats are shown folded over and compressed to form a fairly smooth, rounded cup bottom.

In Figure 13 is shown a modified form of the paper cup in which the rim 23 has been rolled into a beaded cup lip 43. This beading is usually performed after the conical cup has been formed and this may be done either before or after rounding of the cup bottom, as described.

While the pleating shown in Figures 6—12 is horizontal or circumferentially disposed, the cup bottom may be rounded by a similar method in which vertical or longitudinally disposed pleats are formed at the apex of the cup. This alternative is shown in Figures 15—19. The cup 129 is creased vertically by suitable dies to form the creases 133. In either case, however, the paper at the apexial end of the cup is circumferentially gathered to form the cup bottom. These may be formed in various ways, such as creasing the entire area of the apex portion of the cup, as shown in Figure 16, or by equally spaced creases between substantially unaltered portions of the cup wall, as shown in Figure 17. After formation of these creases the entire creased lower end of the cup is compressed between suitable dies to round the cup bottom and form the pleats 134, shown in Figure 19.

The method herein disclosed distributes the paper forming the cup bottom in a uniform manner and prevents the formation of crude irregularities in the cup bottom wall and weakening of the cup bottom by crushing of the irregularly distributed paper. The pleating of the paper in the manner outlined accumulates the excess paper into regular folds of fairly equal thickness, avoids any undue strain on any portion during formation, and thus strengthens the rounded bottom appreciably.

While the method of forming this cup has been described as accomplished by compression dies, it is obvious that various other means may be employed to form the step of successively pleating the portions of the cup which are to be deformed and pressed into the rounded cup bottom.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A frusto-conical paper cup having a rounded bottom, said rounded bottom being formed by pleating the apex of the cup in a series of pleats.

2. A frusto-conical paper cup according to claim 1, having the bottom thereof formed of multiple thicknesses of paper arranged in regular pleats compressed into a rounded bottom.

3. A frusto-conical paper cup according to claim 1, wherein said cup is formed from a flat blank rolled into conical form, the apex thereof being pleated to form a plurality of regular pleats and compressed to form a rounded bottom.

4. A frusto-conical paper cup according to any of claims 1 to 3, wherein the bottom is impregnated with a thermoplastic water-resistant substance.

5. A frusto-conical paper cup according to any of claims 1 to 4, wherein said cup is formed from a flat blank having the portion thereof forming the cup apex impregnated with a thermoplastic water-resistant material, and is rolled into conical form, the apex of the cup

being pleated to form a plurality of regular pleats and compressed to form a hard rounded bottom.

6. A frusto-conical paper cup of less than sixty degree angle comprising an acute angled substantially smooth side wall and a substantially inner concave spoon servicable pleated bottom merging with the side wall, said bottom only having a plurality of circumferentially disposed apexially gathered pleats.

7. A frusto-conical paper cup according to claim 6, wherein the edges of at least some of the pleats are substantially concentric with the axis of the cup.

8. A method of forming a frusto-conical paper cup which includes the steps of forming a plurality of small regular pleats in the apex portion of the cup and compressing the pleated portion of the cup into a rounded bottom.

9. A method according to claim 8, in which the cup is first rolled into conical form from a flat sheet of paper.

10. A method of forming a frusto-conical paper cup of less than sixty degree angle comprising progressively circumferentially gathering and pleating the paper of an appreciable portion of the acute angled side wall of the conical paper cup toward the apexial end thereof and shaping the gathered and pleated paper into a substantially transverse surface to form a rounded spoon-serviceable bottom.

11. A method according to claim 10, wherein the paper is gathered and pleated sequently and radially inwardly by a plurality of steps.

12. A frusto-conical paper cup constructed substantially as herein described with reference to the accompanying drawings.

13. A method of forming a frusto-conical paper cup, substantially as herein described with reference to the accompanying drawings.

Dated the 25th day of November, 1948.

For:
LILY-TULIP CUP CORPORATION
Stevens, Langner, Parry & Rollinson,
Chartered Patent Agents,
5—9, Quality Court, Chancery Lane,
London, W.C.2, and at
120, East 41st Street, New York 17,
New York, U.S.A.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1951.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies, price 2s. per copy; by post 2s. 1d. may be obtained.

Fig. 1

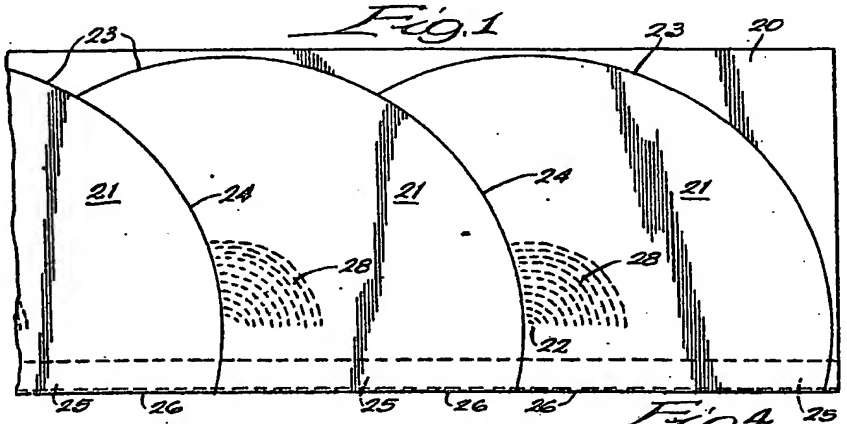


Fig. 2

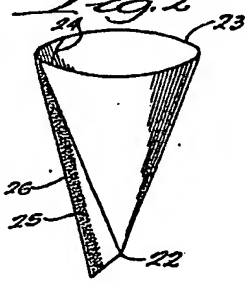


Fig. 3

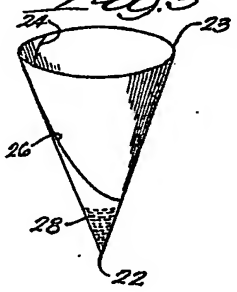


Fig. 4

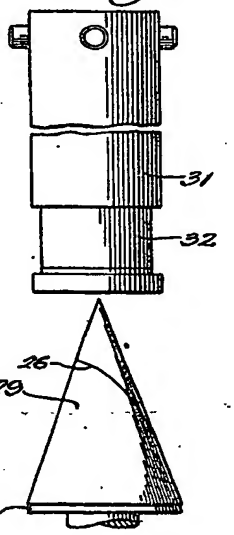


Fig. 5

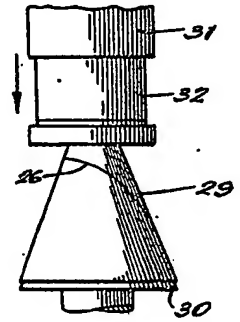


Fig. 6

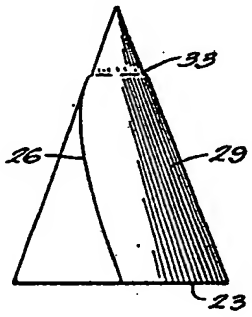


Fig. 7

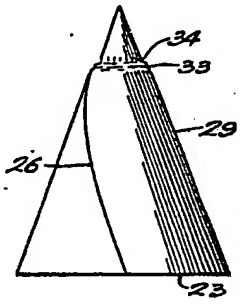


Fig. 8

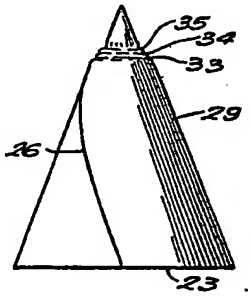


Fig. 9

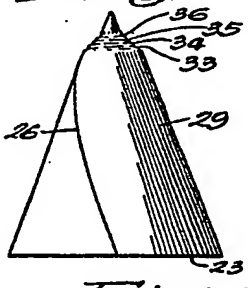


Fig. 10

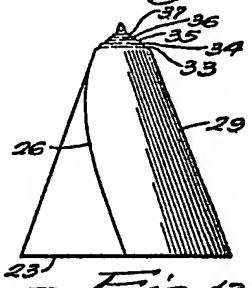


Fig. 11

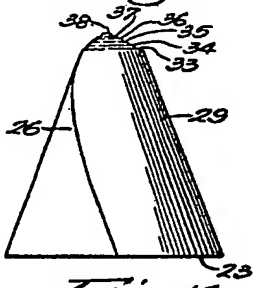


Fig. 12

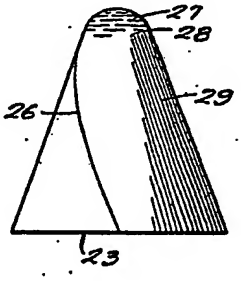


Fig. 13

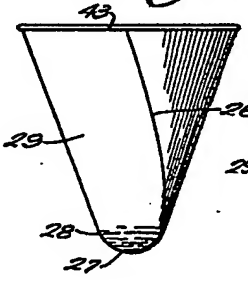
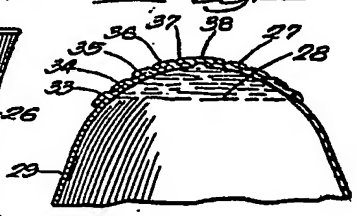
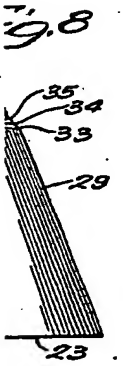
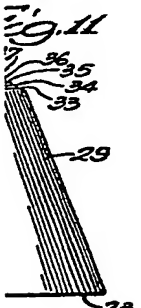


Fig. 14







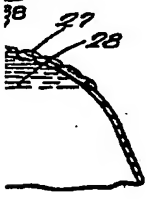


Fig.15

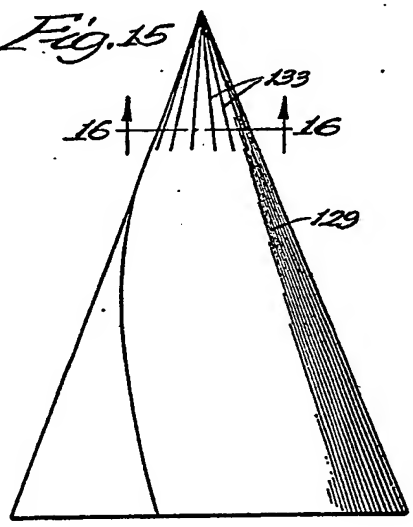


Fig.16

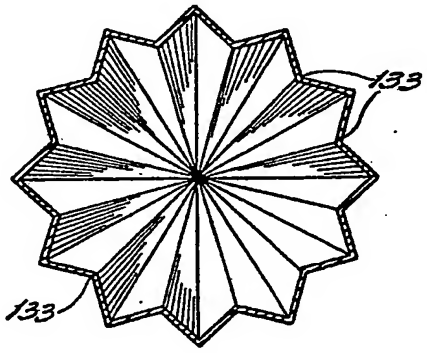


Fig.17

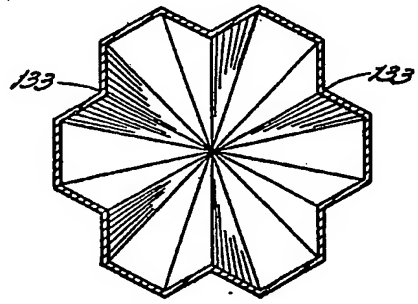


Fig.18

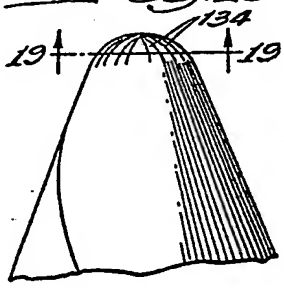
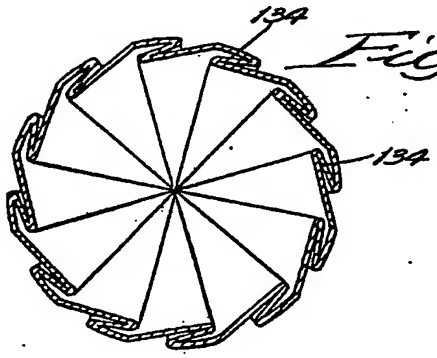


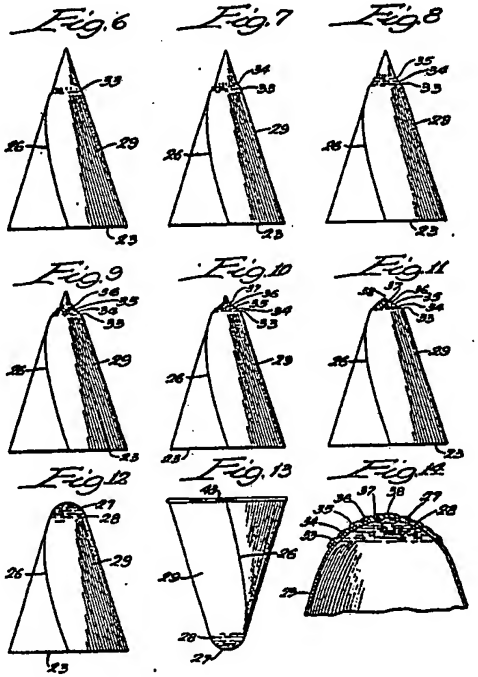
Fig.19



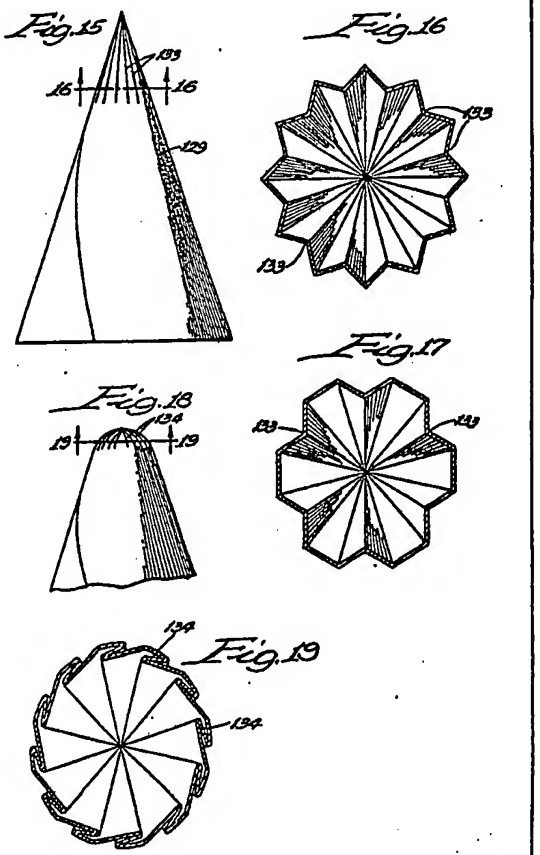
656,868 COMPLETE SPECIFICATION

3 SHEETS

SHEET 2



SHEET 3



This Drawing is a reproduction of the Original on a reduced scale

H.M.S.O.(M.F.P.)